

What is claimed is:

1. A fuel cell feed processing system comprising:
  - A A fuel reformer further comprising a means for introducing gaseous fuel and air into said reformer, said reformer selected from at least one of the group consisting of autothermal, steam, and microchannel types,
  - B A heat exchanger communicably connected to said fuel reformer, and
  - C A scrubber communicably connected to said heat exchanger and further comprising a means for passing scrubbed reformat from said scrubber;wherein said reformer, said heat exchanger, and said scrubber are communicably connected in series so that gaseous material may pass through said reformer, said heat exchanger and said scrubber sequentially.
2. The fuel cell feed processing system as described in Claim 1 wherein said heat exchanger comprises graphitic carbon foam.
3. The fuel cell feed processing system as described in Claim 2 wherein said graphitic carbon foam heat exchanger is a radiant cooler.
4. The fuel cell feed processing system as described in Claim 1 wherein said scrubber comprises carbon fiber composite molecular sieve material.
5. The fuel cell feed processing system as described in Claim 1 wherein said catalytic fuel reactor is located at a point of fuel supply.
6. The fuel cell feed processing system as described in Claim 1 wherein said catalytic fuel reactor is located at a point of fuel usage.

7. The fuel cell feed processing system as described in Claim 1 further comprising a means for recycling gases from said scrubber to said reformer wherein said recycled gases are selected from at least one of the group consisting of carbon monoxide and methane.
8. The fuel cell feed processing system as described in Claim 1 further comprising a pre-scrubber for removal of sulfur compounds, said pre-scrubber further comprising CFCMS material.
9. A fuel cell feed processing system comprising:
  - A A catalytic fuel reactor comprising a catalyst, a catalyst support and a means for introducing gaseous fuel and air into said catalytic fuel reactor, said catalyst support further comprising carbon fiber composite molecular sieve material;
  - B A heat exchanger communicably connected to said fuel reactor;
  - C A scrubber communicably connected to said heat exchanger, said scrubber further comprising a means for passing scrubbed reformat from said scrubber, and
  - D A fuel reformer communicably connected to said scrubber and said heat exchanger;wherein said reactor, said heat exchanger, and said scrubber are communicably connected in series so that gaseous material may pass through said reformer, said heat exchanger, and said scrubber sequentially; said reformer being connected in parallel so that a portion of said gaseous material may be recycled from said scrubber into and through said fuel reformer and returning to said heat exchanger.
10. The fuel cell feed processing system as described in Claim 9 wherein said heat exchanger comprises graphitic carbon foam.

11. The fuel cell feed processing system as described in Claim 10 wherein said graphitic carbon foam heat exchanger is configured as a radiant cooler.
12. The fuel cell feed processing system as described in Claim 9 wherein said scrubber comprises carbon fiber composite molecular sieve material.
13. The fuel cell feed processing system as described in Claim 12 wherein said carbon fiber composite molecular sieve material is activated to adsorb and remove recycled gas from said gaseous material, wherein said recycled gas is selected from at least one of the group consisting of carbon monoxide and methane.
14. The fuel cell feed processing system as described in Claim 12 wherein said scrubber is a two-stage unit capable of isolating carbon monoxide by adsorption.
15. The fuel cell feed processing system as described in Claim 9 wherein said catalytic fuel reactor is located at a point of fuel supply.
16. The fuel cell feed processing system as described in Claim 9 wherein said catalytic fuel reactor is located at a point of fuel usage.
17. The fuel cell feed processing system as described in Claim 9 further comprising a means for recycling gases from said scrubber to said heat exchanger wherein said recycling gases are selected from at least one of the group consisting of carbon monoxide and methane.
18. The fuel cell feed processing system as described in Claim 9 further comprising a pre-scrubber for removal of sulfur compounds, said pre-scrubber further comprising CFCMS material.

19. A method for processing fuel cell feed comprising the sequential steps of:
- A        Reforming a gaseous fuel input in a fuel reformer thereby forming a gas mixture comprising  $H_2$ , CO,  $CO_2$ , and  $CH_4$ , called reformat,
  - B        Cooling said reformat using a heat exchanger communicably connected to said fuel reformer,
  - C        Scrubbing said cooled reformat, in a scrubber communicably connected to said heat exchanger, thereby removing CO,  $CO_2$ ,  $H_2S$ , and  $CH_4$  from the cooled reformat,
  - D        Supplying the cooled and scrubbed reformat to a fuel cell for power generation.
20. The method of Claim 19 further comprising the step of recycling a portion of the cooled and scrubbed reformat back into the reformer wherein said portion comprises at least one of the gases selected from the group consisting of carbon monoxide and methane.
21. The method of Claim 19 wherein said gaseous fuel input is selected from at least one of the group consisting of natural gas, gasoline, and air.
22. The method of Claim 19 further comprising the initial step of pre-scrubbing the gaseous fuel input to remove at least one of the sulfur compounds selected from the group consisting of thiophenes, mercaptans, dimethyl sulfide, and methyl sulfide.